At page 45, line 23, replace "AD.4)" with --AD.4;--.

At page 50, line 7, replace "FEL.DEF" with --REL.DEF--.

At page 50, line 10, replace "REF.DEF" with --REL.DEF--.

At page 53, line 9, replace "entity. (i.e." with --entity (i.e.--.

At page 55, line 1, replace "applicationprogram" with --application program--.

At page 57, line 9, replace "question,?.??" with --question, ?.??--.

IN THE CLAIMS

Please cancel Claims 1-22 without prejudice.

Please add the following claims.

23. (new) A data processing system for processing data stored within a memory means of a computer system, said data processing system comprising:

means, operatively coupled to said memory means, for recording in a table one or more entity type records, each said entity type record stored at a corresponding position within said table and defining a corresponding entity type;

means, operatively coupled to said memory means, for storing a plurality of entities wherein said plurality of entities includes a first subset of entities of a first corresponding entity type of a first of said one or more entity type records and a second subset of entities of a second corresponding entity type of a second of said one or more entity type records;

means, operatively coupled to said memory means, for recording one or more relations between said first subset and said second subset; and

means, operatively coupled to said memory means, for adding to said table a new entity type record in a manner

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so as to preserve said corresponding positions within said table of said one or more entity type records.

24. (new) The data processing system of Claim 23 wherein said one or more entity type records each comprises a field identifying the position within said memory of a corresponding subset of said entities.

25. (new) The data processing system of Claim 23 wherein said means for recording one or more relations comprises means for recording one or more relation type records and means for recording one or more subsets of relation instances corresponding to each of said one or more relation types;

wherein each of said one or more relation type records comprises a field identifying a first of said one or more subsets of relation instances.

26. (new) The data processing system of Claim 25 wherein each of said one or more relation type records further comprises:

a head type field identifying a head type, said head type being a first selected one of said one or more entity type records; and

one or more tail type fields each identifying a tail type, each said tail type being a selected one of said one or more entity type records.

27. (new) The data processing system of Claim 26 wherein said head type field identifies said head type by identifying said corresponding position within said table of said head type.

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28. (new) The data processing system of Claim 26 wherein said tail type field identifies said tail type by identifying said corresponding position within said table of said tail type.

29. (new) The data processing system of Claim 26 wherein each of said one or more relation type records further comprises cardinality data.

30. (new) The data processing system of Claim 29 wherein, upon a first condition of said cardinality data, creation of a first instance of said relation type defined by said relation type record, said first instance identifying a first head entity instance, is caused to fail upon a condition wherein a second instance of said relation type, said second instance identifying said first head entity instance, is in existence.

31. (new) The data processing system of Claim 26 wherein each of said one or more relation type records further comprises mandatory coupling data.

32. (new) The data processing system of Claim 31 wherein upon a first condition of said mandatory coupling data, the creation of an entity of said head type causes creation of a corresponding entity of each of said one or more tail types.

33. (new) The data processing system of Claim 23 wherein said means for recording relations comprises means for recording one or more relation instance records, each said relation instance record comprising:

a head instance field identifying a selected entity of said first subset of entities; and

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a tail instance record identifying a selected entity of said second subset of entities.

34. (new) The data processing system of Claim 33 wherein said first subset of entities is stored at a first position within said memory means; and

further wherein said head instance field identifies said selected entity of said first subset of entities by identifying the position of said selected entity, relative to said first position, within said memory means.

35. (new) The data processing system of Claim 33 wherein said second subset of entities is stored at a second position within said memory means; and

further wherein said tail instance field identifies said selected entity of said first subset of entities by identifying the position of said selected entity, relative to said second position, within said memory means.

36. (new) The data processing system of Claim 33 wherein each said relation instance record further comprises:

a head entity type field identifying said first entity type corresponding to said first subset of entities; and

a tail entity type field identifying said second entity type corresponding to said second subset of entities.

37. (new) The data processing system of Claim 36 wherein said head entity type field identifies said first entity type by identifying said corresponding position within said table of said first entity type.

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38. (new) The data processing system of Claim 36 wherein said tail entity type field identifies said second entity type by identifying said corresponding position within said table of said second entity type.

39. (new) The data processing system of Claim 23 wherein said first subset of entities and said second subset of entities are the same singular subset of entities.

40. (new) A data processing system for processing data stored within a memory means of a computer system, said data processing system comprising:

means, operatively coupled to said memory means, for storing a plurality of entities wherein said plurality of entities includes a first subset of entities and a second subset of entities;

means, operatively coupled to said memory means, for storing in a table one or more relation type records, each said relation type record stored at a corresponding position within said table and defining a corresponding type of relation between said first and second subsets of entities; and

means, operatively coupled to said memory means, for adding to said table a new relation type record in a manner so as to preserve said corresponding positions within said table of said one or more relation type records.

41. (new) An information retrieval system comprising:

a relational database in a memory means of a computer, said relational database having one or more entity types, one or more entity instances of each said entity type, one or more relation types each defining a

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relation between a first and a second of said one or more entity types, and one or more relation instances of each of said relation types each said relation instance defining a relation between a first and a second of said entity instances;

lookup means for retrieving from said memory means a desired entity instance given a relation instance and a known entity instance to which said desired entity instance is associated by said relation instance;

means for storing within said memory a first set of one or more search paths, each said search path comprising data identifying a known entity instance and data identifying a relation instance, said set comprising one or more search paths defining through operation of said lookup means a single set of one or more desired entity instances;

means for storing within said memory one or more sequential sets of one or more search paths, each of said search paths comprising data identifying a relation instance, defining through operation of said lookup means a single set of desired entity instances; and

table means for storing one or more entity instances within said memory; and

means for supplying said first set of search paths to said lookup means and storing one or more resulting desired entity instances in said table means;

wherein said first set of search paths is processed, said processing comprising causing said means for supplying to supply to said lookup means said first set of search paths and to store within said table means one or more resulting desired entity instances;

further wherein each of said one or more sequential sets of search paths is thereafter processed in sequence,

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said processing of a given one of said one or more sequential sets comprising:

combining one or more entity instances stored in said table means with said relation instance of each and every search path of said given set to form a cross-correlated set of new search paths, each said new search path comprising a known entity instance and a relation instance; and

causing said means for supplying to supply to said lookup means said cross-correlated set of new search paths and to store within said table means one or more resulting desired entity instances.

42. (new) An information retrieval system comprising:

(a) a relational database, said relational database having one or more entity types, one or more entity instances of each said entity type, one or more relation types each defining a relation between a first and a second of said one or more entity types, and one or more relation instances of each of said relation types each said relation instance defining a relation between a first and a second of said entity instances;

(b) recursive lookup means for obtaining one or more desired entity instances given one or more relation instances and one or more known entity instances, said recursive lookup means comprising:

(i) results table means for storing one or more entity instances;

(ii) path definition means for forming one or more search paths, each search path comprising an entity instance and a relation instance, said one or more search paths formed by combining one or more entity instances stored in said results table means

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with one or more relation instances supplied to said recursive lookup means;

(iii) singular lookup means for obtaining from said relational database a desired entity instance given one of said search paths; and

(iv) means for storing said desired entity instance in said results table means;

(c) an entity set comprising one of more known entity instances; and

(d) one or more relation sets, each relation set comprising one or more relation instances;

wherein said entity set is stored within said results table means of said recursive lookup means;

further wherein each of said one or more relation sets is supplied to said recursive lookup means in sequence thereby causing by operation of said recursive lookup means compilation of information as defined by said entity set and said one or more relation set and storage of said information within said results table means.

43. (new) The information retrieval system of Claim 42 wherein said entity set and a first of said relation sets are combined to form a path set of one or more search paths, each said search path comprising data identifying an entity instance and data identifying a relation instance;

further wherein each search path is supplied to said singular lookup means thereby obtaining a respective desired entity instance, said respective desired entity instance being stored in said results table means prior to the supplying of each of said one or more relation sets other than said first relation set in sequence to said recursive lookup means.

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44. (new) A method for processing data in a computer having a memory means, said method comprising:

storing within an entity type table in said memory means one or more entity type records, each said entity type record representing an entity type and being located at a corresponding position within said entity type table;

storing within said memory means a first plurality of entities of a first of said entity types;

storing within said memory means a second plurality of entities of a second of said entity types;

storing within said memory means one or more relation records defining one or more relations between entities of said first of said entity types and entities of said second of said entity types; and

adding to said entity type table a new entity type record in a manner so as to preserve said corresponding positions within said entity type table of said one or more entity type records.

45. (new) The method of Claim 44 further comprising the step of retrieving from said memory means a selected one of said first plurality of entities identified by a selected one of said one or more relation records defining a relation between said selected one of said first plurality of entities and a selected one of said second plurality of entities and by said selected one of said second plurality of entities.

46. (new) The method of Claim 44 wherein said step of storing within said memory means one or more entity type records comprises the steps of:

forming one or more entity type records, each said entity type record defining a single entity type;

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forming an entity type table in said memory means capable of containing one or more entity type records; and

storing said one or more entity type records in said entity type table.

47. (new) The method of Claim 46 wherein the step of storing within said memory means one or more relation records comprises the steps of:

(a) forming one or more relation type records, each said relation type record comprising

(i) a head entity type field identifying a first of said one or more entity type records; and

(ii) a tail entity type field identifying a second of said one or more entity type records;

(b) forming a relation type table within said memory means;

(c) storing within said relation type table said one or more relation type records; and

(d) storing within said memory means one or more relation instance records, each said relation instance record correlating to one of said relation type records.

48. (new) The method of Claim 47 wherein said head entity type field identifies said first of said one or more entity type records by identifying said corresponding position within said entity type table of said first of said one or more entity type records.

49. (new) The method of Claim 47 wherein said tail entity type field identifies said second of said one or more entity type records by identifying said corresponding position within said entity type table of said second of said one or more entity type records.

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50. (new) The method of Claim 47 wherein said step of storing within said memory means one or more relation instance records comprises the steps of:

forming within said memory means one or more relation instance tables; and

storing said one or more relation instance records of each of said relation types in a respective one of each of said one or more relation instance tables;

further wherein each said relation type record further comprises:

a relation table field identifying said respective relation instance table.

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51. (new) The method of Claim 50 wherein said each said relation type record further comprises cardinality data;

further wherein said step of storing within said memory means said one or more relation instance records further comprises the steps of:

forming a first relation instance record of a first entity type, said first relation instance record comprising a head entity instance identifying a first entity instance and a tail entity instance identifying a second entity instance;

determining the state of said cardinality data of said first relation type;

upon a first state of said cardinality data, determining whether a second relation instance record of said first entity type, said second relation instance defining a relation between said head entity instance and a third entity instance, said third entity instance being distinct from said second entity instance, is stored within said memory means; and

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storing said first relation instance in said memory means only if no such second relation instance is found to be stored within said memory.

52. (new) A method for processing data in a computer having a memory means, said method comprising:

storing within said memory means a plurality of entities wherein said plurality of entities includes a first subset of entities and a second subset of entities;

storing within a relation type table in said memory means one or more relation type records, each said relation type record defining a type of relation between said first and second subsets of entities;

storing within said memory means one or more relation instance records, each representing an instance of a type of relation defined by one of said one or more relation type records; and

adding to said relation type table a new relation type record in a manner so as to preserve said corresponding positions within said relation type table of said one or more relation type records.

53. (new) The method of Claim 52 further comprising the step of retrieving from said memory means a first entity of said first subset of entities identified by a first relation instance record of said one or more relation instance records, said first relation record defining a relation between said first entity of said first subset of entities and a second entity of said second subset of entities, and by said second entity.

54. (new) The method of Claim 53 wherein the step of storing a plurality of entities comprises the step of:

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(a) storing within an entity type table in said memory means one or more entity type records, each said entity type record representing an entity type and being located at a corresponding position within said entity type table;

further wherein the step of storing one or more relation type records comprises the steps of:

(a) forming said one or more relation type records, each said relation type record comprising

(i) a head entity type field identifying a first of said plurality of entity type records; and

(ii) a tail entity type field identifying a second of said plurality of entity type records;

(b) forming said relation type table within said memory means; and

(c) storing within said relation type table said one or more relation type records.

55. (new) The method of Claim 54 wherein said head entity type field identifies said first of said plurality of entity type records by identifying said corresponding position within said entity type table of said first of said plurality of entity type records.

56. (new) The method of Claim 54 wherein said tail entity type field identifies said second of said plurality of entity type records by identifying said corresponding position within said entity type table of said second of said plurality of entity type records.

57. (new) The method of Claim 54 wherein said step of storing within said memory means one or more relation instance records comprises the steps of:

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forming within said memory means one or more relation instance tables;

storing said one or more relation instance records of each of said relation types in a respective one of each of said one or more relation instance tables;

further wherein each said relation type record further comprises:

a relation table field identifying said respective relation instance tables.

58. (new) The method of Claim 56 wherein said each said relation type record further comprises cardinality data;

further wherein said step of storing within said memory means said one or more relation instance records further comprises the steps of:

forming a first relation instance of a first entity type, said first relation instance record comprising a head entity instance identifying a first entity instance and a tail entity instance identifying a second entity instance;

determining the state of said cardinality data of said first relation type;

upon a first state of said cardinality data, determining whether a second relation instance of said first relation type defining a relation between said head entity instance and a third entity instance, said third entity instance being distinct from said second entity instance, is stored within said memory means; and

storing said relation instance in said memory means only if no such second relation instance is found to be stored within said memory means.

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59. (new) A method for retrieving information stored in a relational database in a memory means of a computer, said relational database defining one or more entity types, one or more entity instances of each said entity type, one or more relation types each defining a relation between a first and a second of said one or more entity types, and one or more relation instances of each of said relation types, each said relation instance defining a relation between a first and a second of said entity instances, said method comprising:

forming within said memory means an inquiry definition table;

forming a search path definition record, said search path definition record specifying one or more entity instances stored in said memory means;

storing said search path definition record in said inquiry definition table; and

retrieving from said memory means said one or more entity instances specified by said search path definition record.

60. (new) The method of Claim 59 further comprising the steps of:

forming one or more additional search path definition records, each said additional search path definition record specifying one or more entity instances stored in said memory means;

storing said additional search path definition records in said inquiry definition table; and

retrieving from said memory means said one or more entity instances specified by said additional search path definition records.

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61. (new) The method of Claim 60 further comprising the step of combining said search path definition record with said one or more additional search path definition records to form a first set of search path definition records.

62. (new) The method of Claim 61 further comprising the steps of:

forming a second set of partial search path definition records;

combining each of said second set of partial search path definition records with each of said one or more entity instances specified by said first set of path definition records thereby forming a second set of search path definition records, each search path definition record of said second set specifying one or more of said entity instances stored within said memory means;

storing said second search path definition records in said inquiry definition table; and

retrieving from said memory means said one or more entity instances specified by said second set of search path definition records.

63. (new) The method of Claim 61 further comprising the steps of:

forming within said memory means a results table; and

storing within said results table data identifying said one or more entity instances specified by said first set of path definition records.

64. (new) The method of Claim 63 further comprising the steps of:

forming a new set of partial search path definition records;

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combining each of said new set of partial search path definition records with each of said one or more entity instances identified by said data stored in said results table thereby forming a new set of search path definition records, each search path definition record of said new set specifying one or more of said entity instances stored within said memory means;

storing said new search path definition records in said inquiry definition table;

retrieving from said memory means said one or more entity instances specified by said new set of search path definition records; and

storing within said results table data identifying said one or more entity instances specified by said new set of path definition records.

65. (new) The method of Claim 64 further comprising the steps of:

combining said first and said new sets of path definition records to form a single inquiry definition specifying a first set of one or more entity instances; and

storing said inquiry definition in said memory means.

66. (new) The method of Claim 65 further comprising the step of reconfiguring said inquiry definition to specify a second set of one or more entity instances.

67. (new) A relational database comprising:

one or more entity type records at respective positions within a memory of a computer; and

means for adding a new entity type record to said relational database in a manner so as to preserve said

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